



Measuring the Potential of Local Green Growth – An Analysis of Greater Copenhagen Highlights

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OECD Report on Measuring the Potential of Local Green Growth

An Analysis of Greater Copenhagen

Highlights

MEASURING THE POTENTIAL OF LOCAL GREEN GROWTH: AN ANALYSIS OF GREATER COPENHAGEN

HIGHLIGHTS

This briefing note summarises preliminary findings from the first case study in an OECD project to develop indicators for the green transition which can be used at the local level¹. This new framework is being tested in regions in five countries: Denmark, Belgium, Chile, Germany and Luxembourg. Early results show that Copenhagen is well advanced on the path to a green economy; however, building on recent achievements, more can be done to accelerate the transition and secure Copenhagen's leadership position in green industries and foster a green way of life for its citizens.

Copenhagen is well advanced on the path to a green economy

Copenhagen is a leader among greening cities. The OECD Dashboard on local green growth confirms that Copenhagen is progressing well in its green transition (see below). Copenhagen's growing clean-tech sector continues to fuel new employment opportunities. The Copenhagen Clean-tech Cluster (CCC) is key to this growth. Companies in the region have a combined turnover of €30 billion (2011). At least €12 billion of this is directly related to clean-tech activities. In total, the companies employ 78,000 people, and roughly 34,000 of these are working directly with clean-tech-related activities. The main sectors are energy efficiency, renewable energy, water and wastewater treatment as well as waste and recycling.

Furthermore, despite uncertain economic conditions, 44% of companies related to clean-tech experienced employment growth in 2010. Only 9% experienced a decline. Green investment is driving new business opportunities, and in the process generating demand for both new jobs and different types of jobs. These gains show that urban, green and growth can go hand in hand.

The economic benefits of green growth are also evident in the industrial growth figures for the Greater Copenhagen region². Figures 1 and 2 show how 'green turnover' and exports grew dramatically between 2004 and 2009 by 55% and outperformed other key sectors of the economy such as welfare technology (35%) and manufacturing (8%)³. During the same period, green technology exports grew by 77% outperforming welfare technology (30%) and manufacturing (-12%).

1 The full report will be available in December 2012.

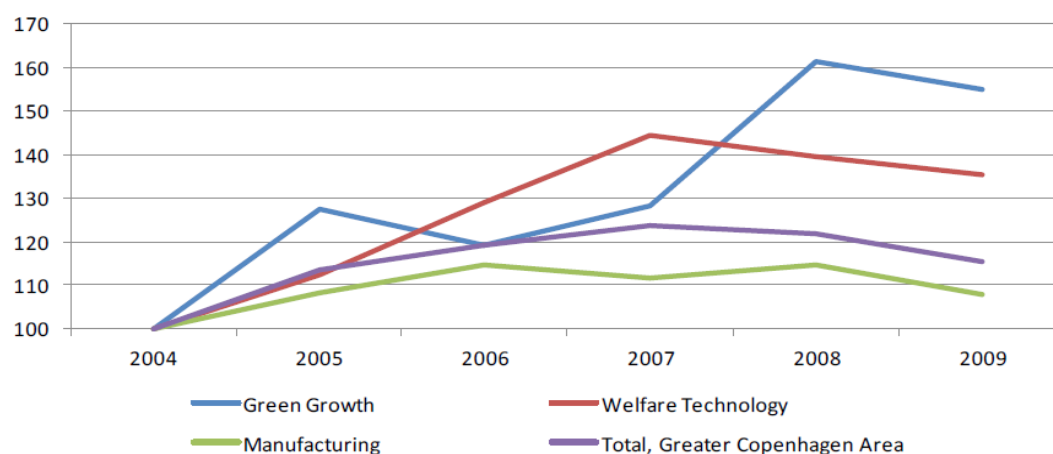
2 Green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which well-being relies.

3 Green sectors include those related to environmental protection and resource management products, services and technologies such as installation and maintenance of solar cells and windmills, environmental surveillance, maintenance of septic tanks, water purification. The 'welfare technology' sector refers to industrial activities that focus on products and services that help people with disabilities to be more independent. In Denmark, this is a new statistical sector, and it has been identified as a high growth sector (for example see <http://velfaerdsteknologi.nu/nyheder/analyser/velfaerdsteknologi-som-ressourceomraade> (in Danish) and as such is comparable with the green sector. Manufacturing refers to the statistical definition of the manufacturing sector in Denmark [DAMVAD (2011)].

Growth rates of turnover in key industries in the Greater Copenhagen area

Index: 2004=100

Growth rates of turnover in key industries compared to the Greater Copenhagen Area as a whole

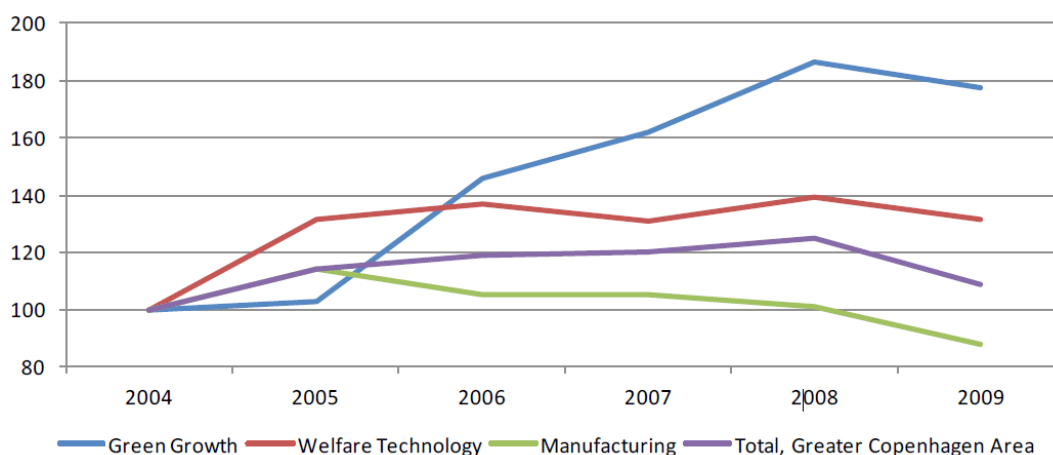


Note: Green growth is defined using the Berkeley Roundtable on the International Economy and the OECD definition of environmental goods and services, which includes products, services and technologies for environmental protection and resource management.

Source: DAMVAD A/S (2011), Green Growth in Copenhagen.

Export growth in key sectors in the Greater Copenhagen area

Index: 2004=100



Note: Green growth is defined using the Berkeley Roundtable on the International Economy and the OECD definition of environmental goods and services, which includes products, services and technologies for environmental protection and resource management.

Source: DAMVAD A/S (2011), Green Growth in Copenhagen.

As illustrated in Table 1, green technologies generate revenue for Copenhagen, but also provide the city with a strategic 'green advantage' in one of the fastest growing industries in the world.

Table 1. Growth in turnover in the Capital Region

Turnover	2004	2005	2006	2007	2008	2009
Green Technology	100	127	119	128	162	155
Welfare Technology	100	112	129	145	139	135
Manufacturing	100	108	115	111	115	108
ICT	100	105	108	129	135	130

Note: 2004 is reference year.

Source: Wiking M., (2011), Copenhagen – Beyond Green, The socioeconomic benefits of being a green city.

Denmark owes this strong performance to a number of factors. Like other Danish cities, Copenhagen has developed various types of climate or sustainability strategies. Several green cross-municipal networks have been established. Copenhagen's progress to date also benefits from a series of favourable conditions, including: the rich institutional, cultural and resource capacities of the city; the installation of a district heating system; the drive for energy security through renewable energy (particularly the wind industry); and the tradition of collaboration and consensus-building within the political system.

This environment has delivered Copenhagen and its clean-tech firms significant first mover advantages in green industries and technologies, and acted as a magnet for attracting investment to the country. Today, the clean-tech cluster in the Greater Copenhagen Region, is known as one of the leading clean-tech clusters in the world. It now hosts more than 600 companies with expertise in efficient and renewable energy, water and wastewater, and recycling. It is one of the main actors in Copenhagen's transition towards a low-carbon economy.

Continued investments are needed

Copenhagen must continue to invest in the green transition. Cities and countries are competing head to head as they attempt to give their own domestic companies a running start in an emerging and lucrative market place of the future. A number of strategies can ensure Copenhagen's leadership in the market and maintain its competitive edge.

Investments will help the region exploit its existing strengths and competitive advantages. Danish financial institutions and Copenhagen's Investment Agency (Copenhagen Capacity) can provide essential support to mature firms and newer companies seeking to obtain finance. Both new and existing small and medium sized (SMEs) experience constraints due to their small size. Support through the provision of information and advice to help them access markets; and assistance in connecting them to venture capital firms and other financial institutions can help innovation processes for developing new products and services. Guarantees are another means to support the region's competitiveness. For example, the Nordic Investment Bank (NIB) can underwrite the development of catalyst technologies for energy efficient processes used for removing harmful emissions, production of clean fuels and power generation.

Foreign direct investment (FDI) can also fuel further developments, and a number of steps can be taken to strengthen Copenhagen's attractiveness to this type of investment. FDI to clean-tech companies since 2010 to 2012 has led to the creation of nearly 200 new jobs. The attractiveness of the cluster is likely to have influenced other investments, too – in both Danish and foreign companies.

Local institutions, particularly Copenhagen's Investment Agency, should further strengthen the networking infrastructure developed for the clean-tech cluster. It can do this by providing specialised knowledge intensive service activities (KISA) that reach both mature innovative firms and the start-ups entering the market. This can include knowledge on new or existing markets, marketing advice and marketing research services. Strategic assistance on intellectual property rights, and particularly with patents in emerging markets such as China and India, can provide a valuable service for smaller clean-tech firms which cannot afford to have in-house expertise in these areas. These can incentivize a knowledge-hub which appeals to foreign firms looking to locate to where the latest innovations are being generated.

Private banks are also active participants in the green transition, and have demonstrated that green business is good business. For example, Danske Bank has increased its investment in assets under management in order to meet its Social Responsibility Investment Policy, from DKK 506 billion in 2009 to DKK 596 billion in 2011, and it has been recognized for its achievements. More widely in the Nordic region, the Sustainable Asset Management Index of the Dow Jones, based in Zurich, has now developed its own Nordic Index to support the future growth and development of clean-tech opportunities. These are just a few examples of how green and business can go hand in hand, and others should follow suit.

Connecting the cluster with financial institutions can also help create a virtuous cycle for investment. As banks gain a better understanding of the work of clean-tech firms, they can provide better advice to develop the competitiveness of the cluster, which in turn can improve access to venture capital. This dynamic will help to attract FDI and new firms to the area.

Invest in capacity for greening jobs, skills and entrepreneurship

It is important to take advantage of the existing clean-tech companies to strengthen research cooperation with universities and/or increasing their involvement with the cluster's activities. Knowledge sharing and research cooperation are integral to the operation of the cluster already, but to ensure the vitality and longevity of the cluster these relationships need to be deepened. A specialised pool of human talent is the central asset of a cluster; Copenhagen will need to continue to develop the capacity and capability of its human resources, whilst ensuring the city has the continued ability to attract these specialised skills. The mobility of people with green skills in turn encourages entrepreneurship and the growth of new and existing firms. Investments need to cover not just the development and attraction of skilled people but also the spaces them to interact and resources to incubate new ideas and business opportunities.

Other forms of green skills development can be facilitated through informal knowledge intensive activities. Universities, training institutions, trade unions and business organizations should introduce specific instruments related to green entrepreneurship.

Local institutions can also boost green skills; green public procurement for example can be a significant instrument for the local SMEs providing products and services, influencing the knowledge and skills of their employees.

Boosting innovation through business-university links Accelerating the transfer and diffusion of new knowledge and technology will further support Copenhagen's innovative companies. Copenhagen clean-tech companies already collaborate through a close-knit network of companies and knowledge institutions.

But more can be done on this front. Denmark is dominated by SMEs. SMEs typically interact much less with university research than larger firms. Closing this gap will propel innovation, as universities are essential cogs in the innovation machine. But this is not an easy task. SMEs often use applied, practical research, which can help to foster incremental innovation, rather than basic research carried out in universities.

There are various ways to strengthen links between SMEs and universities. One is to facilitate internships of graduate students, who can look at the production processes with a critical eye. This is good for both increasing productivity and improving job prospects for students. Another is to support green technology brokers, which can play a role of facilitator between firms and research institutions. Finally, facilitating the networking of firms always helps, as it gives businesses the opportunity to share their experience in tackling emerging issues in their production processes, and together identify collaboration opportunities.

Foster 'disruptive' innovation

It is possible for Copenhagen to take advantage of the mature development stage of the region in green technology and practice to develop more radical green innovations. Copenhagen has unique opportunities to experiment with advanced green solutions within smart modes of organising production and consumption and technical infrastructures in a liveable city. These novel solutions should be visibly demonstrated and highlighted in the city, contributing to the development of further green Copenhagen symbols such as the well-established bicycle use and the more novel harbour swimming basins. Such initiatives may attract the interest of early stage investors and venture capital to seed new green technologies of the future. Such new projects will reinforce Copenhagen's brand and international standing as a laboratory for new green products and services, and a test-bed for disruptive innovation as it displaces conventional production and distribution means grounded in 20th Century economic and technology paradigms. Such an initiative will also strengthen the interest of financial markets in Copenhagen Clean-tech Cluster's (CCC) companies and the projects in which they are participating.

Strengthen cross-sector linkages to connect global and local firms

Place and community space are important in connecting and mobilising activities between core clean-tech companies and other industries and services such as engineering and smart integration manufacturing companies, finance and marketing, and scientific companies. Generating and reinforcing such connections will allow clean-tech firms to maximise the competitive advantages the cluster offers.

Copenhagen City should, through its membership of the C40 group of cities, and the CCC through ICN, fully exploit the opportunities for international collaboration, and support smart city initiatives that bring together Danish and partnering overseas companies in the strong growth and emerging markets.

Develop a bottom-up, next generation governance architecture

Copenhagen can build on CCC's success and develop a governance structure that builds investment opportunities for clean-tech companies from the bottom up. This includes the formulation of

a responsive and integrated platform that maximises triple helix partnerships between governments, businesses and universities in the delivery of state of the art and investment driven projects.

CCC's next generation architecture would include a dynamic market driven framework and programmes to support companies within the cluster and those suppliers and customers with whom they interact commercially, which may not see themselves as green growth companies, but which are nonetheless an indispensable part of the broader eco/industrial ecology of the clean-tech cluster.

Develop a people driven investment agenda

Copenhagen is a liveable city and is ranked as one of most sustainable cities in the world. Copenhagen's governance architecture has been effective in marshalling the resources and knowledge of the entire community and in the process formulating practical pathways to implement integrated green growth projects.

The Capital Region of Denmark, Copenhagen City and the CCC should work more closely together with the business community to forecast future investment plans (including, for example: infrastructure; building and construction; urban development; transport; and in key clusters such as information and communication technology (ICT) and life sciences) to spin off complementary projects that can build a strong, vibrant and sustainable community. The social and economic benefits to the community of maintaining investment in these activities needs to be brought to the fore. The links with ensuring growth of the liveable aspects of Copenhagen need to be underlined so citizens and investors have a common interest in success.

Stimulate education, research and exchange programmes

Copenhagen Capacity has developed the International Clean-tech Network (ICN) in partnership with the Colorado clean-tech cluster in the United States with the aim of ultimately linking together 15 other clean-tech clusters globally, especially in the emerging markets of Brazil, China and Russia. This gives Danish companies global reach, in a manner that would, for many smaller companies, simply be impossible to achieve on their own. In fact, the ICN also acts as a point of dissemination for Danish green know-how to the rest of the world, while ensuring that CCC is kept abreast of global clean-tech trends, business and investment opportunities. The CCC should strengthen collaboration arrangements through the ICN to expand its research and university exchange program.

In particular, this would see greater co-operation between businesses, universities and knowledge institutions involved through the ICN, which can support commercialisation and research and development (R&D) activities of member clusters into target markets and thus reinforce CCC's commercial footprint in international clean-tech projects.

Strengthen communication about best practices and successes

Each new export contract builds expertise on the ground for Danish companies involved in such initiatives. Through this process, Denmark's intellectual and industrial fabric is strengthened. These enhanced capacities and capabilities provide the necessary conditions to attract foreign direct investment, to either partner with Danish companies working at the frontiers of new ideas and environmental technologies, or to build supply chain strategies by maximising opportunities available in Denmark and Greater Copenhagen. Together, these factors directly contribute to the attractiveness of the City of Copenhagen and the Greater Copenhagen Region as an investment and talent destination. Invest-

ment in communication of these best practices will encourage the circulation of financing knowledge throughout Copenhagen.

Measuring progress is key for success in transition to a low carbon-economy

This report represents an important step forward in building the tools needed for proper assessment of the green transition. Copenhagen and its local institutions are leading the way in this ambitious task. Further development of green indicators data at the local level will help provide a clear assessment of Copenhagen's trajectory, which seems promising given its performance today. This includes measuring the number of patents for climate change technologies; positions in research and development; and students in environmental subjects. The local green growth dashboard provides a core dataset for strategic planning and dialogue to underpin green growth.

About the development of indicators to measure local green growth

The OECD Green Growth Strategy, delivered at the 2011 OECD Ministerial Council Meeting, conceives green growth as a way to pursue economic growth and development while preventing environmental degradation, biodiversity loss and unsustainable resource use. It also highlights that, to realise the potential for a more sustainable economy and future that green growth promises, widespread change is required - in the political landscape, in institutions, in the economy and in social values.

In this vein, the OECD has started a reflection on how best to track progress at the local level. The rationale is threefold: First, there are many ways with which communities can contribute to transition to a low-carbon economy at their level, and measuring that contribution can nurture that progress. Second, the impacts of climate change can vary locally; and third, the enactment and impacts of policies to mitigate climate change, such as pricing carbon, switching to less carbon intensive energy supply and production, and appropriating the opportunities presented by a transition to a low carbon economy (including the creation of both new employment and industries) will be distributed differently across regions and localities.

Accordingly, a project on "Indicators of local transition to a low carbon economy" is being implemented in selected pilot areas to elaborate and test some indicators for the local level. A set of local indicators has been developed in consultation with the other pilot areas, taking into consideration data availability, current and proposed policy activity, cross-border implications and an assessment of the literature on green jobs and skills for data collection methods and options.

As part of the process to analyse and compare across local areas a 'dashboard' data visualisation tool is being developed for each of the case study regions. Out of the 23 indicators developed by the OECD monitoring framework, the local indicators framework focuses on 14 indicators (six for environmental and resource productivity and eight on economic opportunities).

The resulting local level indicator framework covers the following dimensions:

1. *Environmental and resource productivity.* This captures the headline resources productivity figures for the local area.
2. *Economic opportunities.* This examines the capacity of the areas to act on the low carbon opportunities. It includes measures of research and knowledge intensity and workforce in the green economy.

3. *Policy responses.* This item aims to capture the capacity of local actors in green policy making. Green policy is a new area of knowledge and policy development for many local governments; they need to build not only political consensus for action, but also internal capability and capacity of policy design, implementation and evaluation.
4. *Skills and training ecosystems.* This item aims to captures the progress of green skills development and skills ecosystems.

Indices are built on the first two items using data from national and local sources. Comparisons are then made with corresponding OECD, EU or national averages depending on data availability. For the last two items, data are collected through surveys with local stakeholders (representing government, business, trade unions, higher education institutions, etc.). For Copenhagen, these data were validated in a workshop held in the city in October 2011.

The results of the exercise for Copenhagen can be summarised as follows:

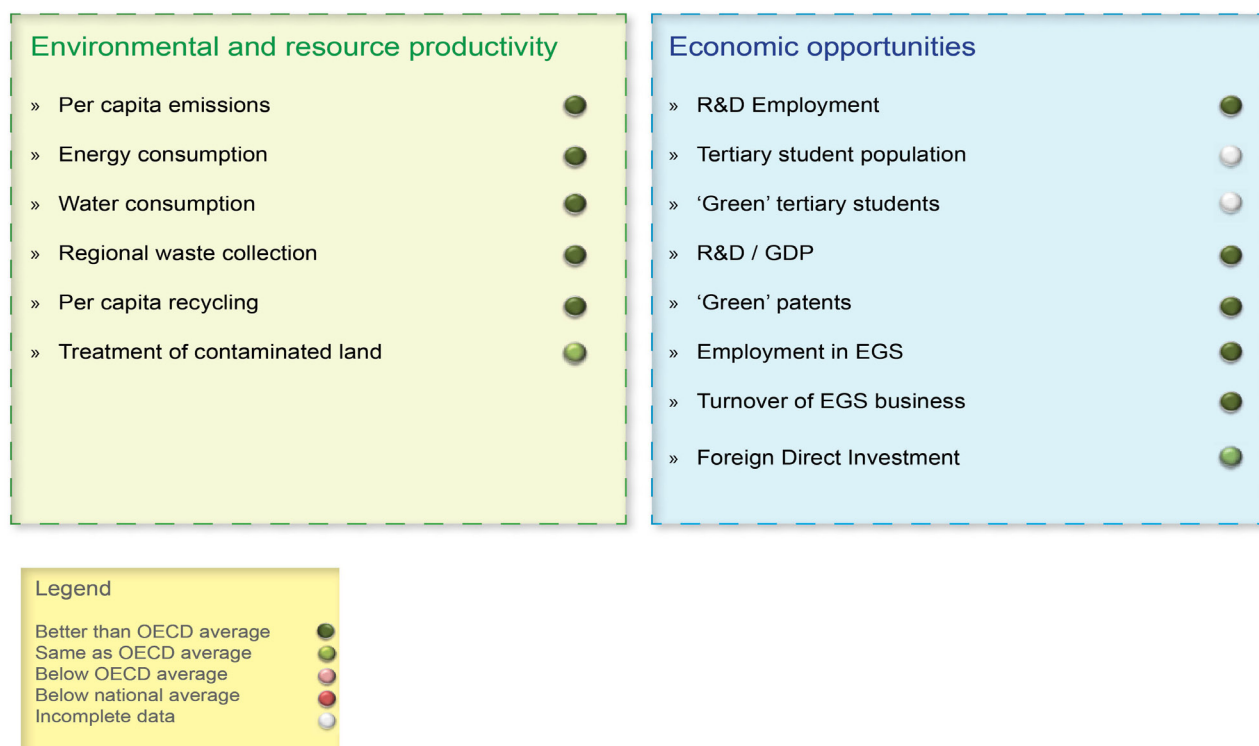
Environmental and resource productivity: Copenhagen performs at least as well as the OECD average with respect to the following measures: per capita emissions, energy consumption, water consumption, regional waste collection, per capita recycling and treatment of contaminated land.

Economic opportunities: Copenhagen performs better than the OECD average on R&D expenditure and employment, green patents, employment in environmental good and services, and turnover of environmental good and services business.

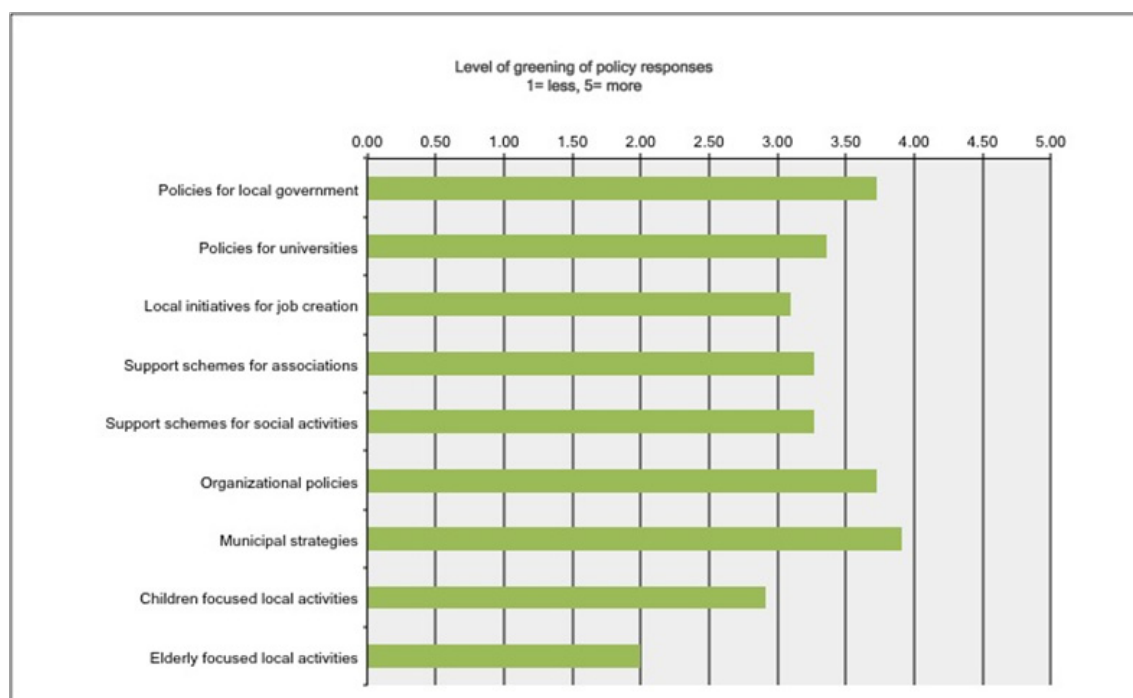
Policy responses: They show that Copenhagen can progress further. Local government policies and municipal strategies have a higher degree of ‘greening’ than policies for universities, job creation initiatives, support schemes for social assistance including for the elderly population.

Green skills ecosystem: Copenhagen’s green skills ecosystem can be further developed by reinforcing links of industry and research and universities, fostering green vocational education and training, and cooperating further with the private sector and trade unions to boost green skills development and training.

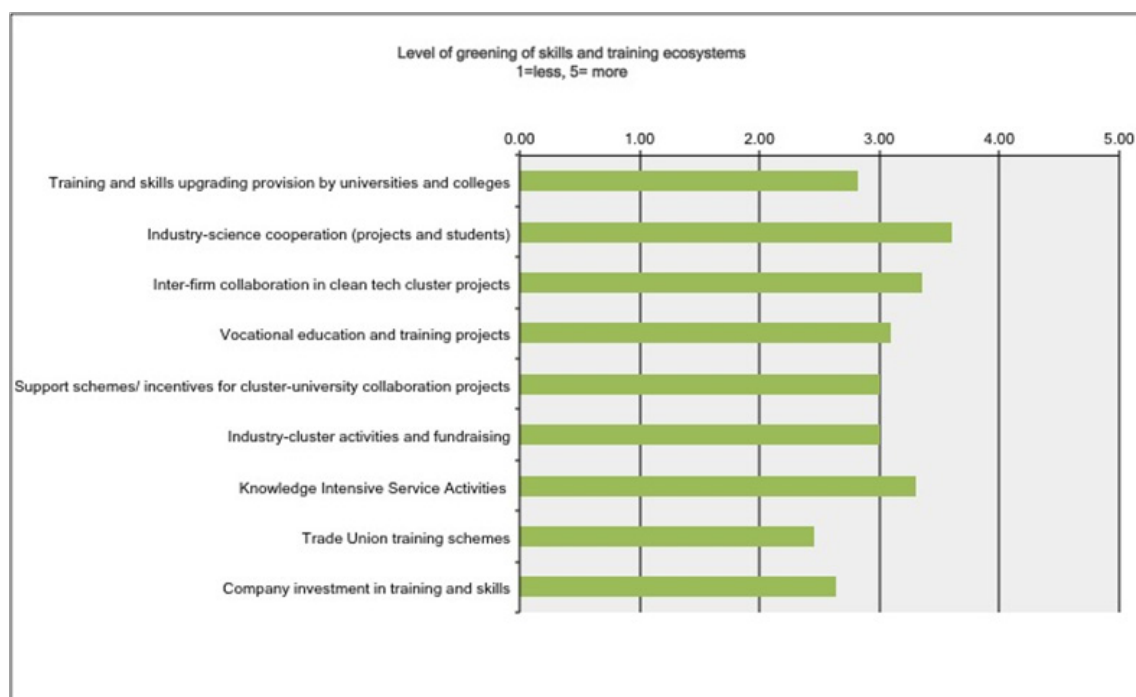
COPENHAGEN DASHBOARD ON LOCAL GREEN GROWTH



COPENHAGEN - LOCAL POLICY ASSESSMENT FOR GREEN GROWTH



COPENHAGEN - SKILLS ECOSYSTEM ASSESSMENT FOR GREEN GROWTH





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